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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/799,859	03/15/2004	Takeo Tsukamoto	03500.015727.1	7003
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FITZPATRICK CELLA HARPER & SCINTO			HINES, ANNE M	
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NEW YORK, NY 10112			PAPER NUMBER	
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Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No. 10/799,859	Applicant(s) TSUKAMOTO, TAKEO	
	Examiner Anne M. Hines	Art Unit 2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 40-60 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 40-60 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2004 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>8/9/05, 3/15/04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The amendment filed on December 5, 2005, has been entered and acknowledged by the Examiner. The certified English translation of Japanese Application No. 2000-265819 filed on November 18, 2005 overcomes the 102(e) rejection based on Murakami et al. (US 2002/0009637).

Claims 40-60 are pending in the instant application.

Information Disclosure Statement

Choi et al. (US 2001/0006232) has been considered. See attached PTO 1449 form. H. Dai et al. (Nature article) has been received and considered. See attached PTO 1449 form.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 40-60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deguchi et al. (US Pat. No. 6,400,091) (of record) and Rodriguez et al. ("Catalytic Engineering of Carbon Nanostructures," Langmuir 11, pp. 3862-3866 [1995]) (of record).

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Regarding claims 40, 52, and 58 Deguchi teaches a method of manufacturing an electron-emitting device, comprising the steps of: providing a substrate (Fig. 1A,11; Column 11, line 28) on which a first electrode (Fig. 1A,12; Column 11, line 28) and a second electrode (Fig. 1A,15; Column 11, lines 38-40) are disposed; and arranging a plurality of carbon fibers on the first electrode (Fig. 1A,14; Column 11, lines 28-29; Column 5, line 64 through Column 6, line 3), wherein each carbon fiber has a plurality of graphenes (Fig. 1A,14; Column 5, line 64 through Column 6, line 3). Deguchi fails to teach wherein the graphenes are stacked in a direction different from a direction perpendicular with respect to an axis direction of each carbon fiber, as required by claim 40. Deguchi also fails to teach wherein the graphenes are stacked along an axis direction of the carbon fiber, as required by claim 52. Deguchi also fails to teach wherein the graphenes are stacked so as not to be parallel to an axis direction of each carbon fiber, as required by claim 58. Rodriguez teaches wherein the graphenes are stacked in a direction that is not perpendicular to an axis direction of the carbon fiber. (Page 3864: "the graphite platelets are aligned at an angle to the fiber axis") in order to have specific electrical properties (Page 3862). Rodriguez also teaches wherein the graphenes are stacked so as not to be parallel to an axis direction of each carbon fiber (Page 3864: "the graphite platelets are stacked ... perpendicular to the fiber axis") in order to have specific electrical properties (Page 3862). Finally, Rodriguez teaches wherein the graphenes are stacked along an axis direction of the carbon fiber (Page 3864: "the platelets are aligned in a direction parallel to the fiber axis") in order to have specific electrical properties (Page 3862). Therefore, it would have been obvious to one

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of ordinary skill in the art to modify the carbon fibers of Deguchi to have a graphene structure in any of the orientations required by claims 40, 52 and 58, in order to have specific electrical properties, as disclosed by Rodriguez.

Regarding claim 46, Deguchi a method of manufacturing an electron-emitting device, comprising the steps of: providing a substrate (Fig. 1A,11; Column 11, line 28) on which a first electrode (Fig. 1A,12; Column 11, line 28) and a second electrode (Fig. 1A,15; Column 11, lines 38-40) are disposed; and arranging a plurality of carbon fibers on the first electrode (Fig. 1A,14; Column 11, lines 28-29; Column 5, line 64 through Column 6, line 3), wherein each carbon fiber has a plurality of graphenes (Fig. 1A,14; Column 5, line 64 through Column 6, line 3). Deguchi fails to teach wherein the graphenes are stacked in a direction that is not perpendicular to an axis direction of the carbon fiber. Rodriguez teaches wherein the graphenes are stacked in a direction that is not perpendicular to an axis direction of the carbon fiber. (Page 3864: "the graphite platelets are aligned at an angle to the fiber axis") in order to have specific electrical properties (Page 3862). Therefore, it would have been obvious to one of ordinary skill in the art to modify the carbon fibers of Deguchi to have a graphene structure that is not perpendicular to an axis direction of the carbon fiber, as disclosed by Rodriguez, in order to have specific electrical properties.

Regarding claims 41, 47, and 53, Rodriguez further teaches wherein the providing step includes processes of: arranging a plurality of catalyst particles so as to be connected to the first electrode; and growing the plurality of carbon fibers by a reaction between the plurality of catalyst particles and a gas containing carbon (Page

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3864, "carbon fibers produced from the interaction powder ... with a CO/H₂ mixture").

Motivation to combine is the same as for claims 40, 46, 52, and 58 above.

Regarding claims 42, 48, and 54, Rodriguez further teaches wherein the catalyst particles contain iron (Page 3864). Motivation to combine is the same as for claims 40, 46, 52, and 58 above.

Regarding claims 43, 49, and 55, Deguchi further teaches wherein at least one or more of the carbon fibers are formed to have ends apart from a surface of the second electrode (Fig. 1A; Column 11, lines 43-45).

Regarding claims 44, 50, 56, and 59, Deguchi further teaches wherein an electron source is manufactured having a plurality of electron-emitting devices (Column 14, "Example 5"; Fig. 3).

Regarding claims 45, 51, 57, and 60, Deguchi further teaches an image forming apparatus comprising a substrate (Fig. 3,42) having a third electrode (Fig. 3,46) and a phosphor (Fig. 3, 44), and an electron source disposed in opposition to and spaced from the substrate (Fig. 3,43).

Response to Arguments

Applicant's arguments filed November 18, 2005 have been fully considered but they are not persuasive.

Applicant argues that the Deguchi reference does not disclose or suggest a carbon fiber of a crystal structure, as claimed by applicant, or a configuration other than a carbon nanotube for use in an electron-emission member. Applicant further argues

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that the Rodriguez reference does not disclose or suggest providing a carbon nanotube in an electron-emitting device. Applicant concludes that the Deguchi and Rodriguez references lack motivation for combination and any combination thereof is impermissible hindsight.

The Examiner respectfully disagrees. Deguchi teaches an allotrope having a graphene structure including graphite and carbon nanotubes (Column 6, lines 3-5). Rodriguez teaches carbon nanotubes with graphite platelets and that these structures have unique electronic properties for commercial applications (Page 3862). In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, However, the Examiner considers both Deguchi's teaching of graphene structures including graphite and carbon nanotubes and Rodriguez's teaching of carbon nanotubes with graphite platelets having unique electronic properties for commercial applications to be sufficient motivation for one of ordinary skill in the art to modify the Deguchi reference to have the carbon nanotubes with graphite platelets of Rodriguez.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Anne M. Hines whose telephone number is (571) 272-2285. The examiner can normally be reached on Monday through Friday from 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (571) 272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Anne M Hines
Patent Examiner
Art Unit 2879

AMH
2/18/06

msgo 2/14/06
MARICELI SANTIAGO
PRIMARY EXAMINER